



### 1. STANDARDIZATION OF *IN-SITU* MOISTURE CONSERVATION METHOD FOR ESTABLISHMENT OF AONLA ORCHARDS ON SLOPPY DEGRADED WASTELANDS

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**ABSTRACT:** A study was carried out in Krishi Vigyan Kendra, Deendayal Research Institute, Satna for two consecutive years to evaluate the effect of various *in-situ* moisture conservation measures on establishment and growth of aonla (*Embllica officinalis*) in sloppy degraded lands. *In-situ* moisture conservation measures included for the study were preparation of circular ring basin + mulching the basin with black polythene, staggered contour trenching (45 cm width and 3 m length) on upper side of the plant basin, placement of one submerged pitcher in one side of the plant for rainwater harvesting, setting the seedling in a depression of 1 m width and 15 cm deep, surrounded by a ring-shaped ridge with 25 cm width and 15 cm height and a 30 cm opening on the higher side to harvest rain water + filling the depression with straw + mulching with black polythene and control (no micro- catchment or mulch). The results revealed that all the *in-situ* moisture conservation methods showed improvements in survival, establishment and growth of aonla plants. However, preparation of micro catchment area of one meter width surrounded by ring shaped ridge of 25 cm width and 15 cm height and having a 30 cm opening at the higher side and mulching in depressed area with straw and cover with black polythene was found to be the most effective moisture conservation method in increasing the survival and growth of aonla seedlings/budlings among all the conservation treatments.

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### 2. PERENNIAL CHILLIES GERMPLASM IDENTIFIED AND EXPLORED FROM BIHAR

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**ABSTRACT:** Quality seeds are the indispensable material for successful crop production. Germplasm resource contains unique traits/genes that can be utilized for further crop improvement. Exploration for collection of germplasm is the quickest and simplest method for acquiring the desired one. Perennial type of chillies has been identified and explored from WALMI Research farm of ICAR Research Complex for Eastern Region Patna (Bihar). This unique germplasm has been entered in the seventh successive years of successful fruiting. Such distinctive genotype could be a great value for kitchen garden purpose, particularly in the era of nucleus family. Such promising and unique germplasm can be utilized by chillies worker in their respective on going/ensuing crop improvement programme to reinforcement food and nutritional security of country by efficient utilization.

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### 3. FOLIAR APPLICATION OF POTASSIUM, CALCIUM, ZINC AND BORON ENHANCED YIELD, QUALITY AND SHELF LIFE OF MANGO

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**ABSTRACT:** Mango, the national fruit of India, has developed its own importance all over the world. Being a useful and delicious fruit, it is the part of culture and religion since long time, and now, it is recognized as one of the best fruits in the world market. Calcium and potassium amongst major nutrients as well as zinc, boron amongst micro nutrients have been found to play a major role in maintenance of mango fruit quality. Moreover, for rapid response and correction of deficiencies of mineral nutrients, foliar spray of nutrients especially Ca, B, Zn and K have been used singly or in combination. The experiment was conducted on mango cv. Dashehari at Horticulture Research Centre, Patharchatta, G.B. Pant Univesity of Agriculture and Technology, Pantnagar. The experiment involved the pre-harvest foliar spray of nutrients at 'marvel stage' of

mango fruits. The treatments included  $\text{CaCl}_2$ @1.2%, Borax@0.5%,  $\text{K}_2\text{SO}_4$  @ 0.5%,  $\text{Ca}(\text{NO}_3)_2$ @1.0%,  $\text{ZnSO}_4$ @0.5%,  $\text{ZnCl}_2$ @0.3% and control. The results obtained indicated that the trees sprayed with 0.5% borax showed maximum fruit yield, fruit weight, fruit volume, T.S.S., reducing sugar, non reducing sugar and ascorbic acid content, however, this treatment found to be at par with 1%  $\text{Ca}(\text{NO}_3)_2$ . While with regard to maintenance of post harvest fruit quality in mango, the minimum physiological loss in weight was reported in 1.0%  $\text{Ca}(\text{NO}_3)_2$  followed by  $\text{CaCl}_2$  (1.2%) up to the end of 12<sup>th</sup> day. Other quality parameters like fruit TSS, sugar and ascorbic acid content were best maintained by borax, calcium and potassium treatments.

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#### **4. STUDIES ON THE EXTENT OF GENETIC CONTAMINATION IN SEED PRODUCTION OF EXERTED STIGMA TOMATO (*Solanum lycopersicum* L)**

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**ABSTRACT:** Studies were conducted at the experimental farm of Punjab Agricultural University, Ludhiana, during Rabi season for three years, 2006 to 2010 to standardize the minimum isolation distance required for maintaining genetic purity in hybrid seed production of exerted stigma (recessive) tomato under open field conditions. The exerted stigma seed parent with recessive potato leaved seedling marker was sown at 25 m, 50 m, 75 m, 100m, 150m, 200m and 250m distance away from normal stigma (inserted) contaminator parent cv. Castle Rock having dominant cut leaf seedling marker. The pooled data of three years indicated that the highest percentage of genetic contamination of 9.26% was recorded at a distance of 25 m from the contaminator (Castle Rock). It was also observed that there was a gradual reduction in contamination level with increasing distance at 100m isolation distance of 2.56% although it was not within the prescribed maximum permissible limit of genetic contamination (1 and 2% for foundation and certified seed, respectively). There was zero genetic contamination at the highest isolation distance of 150 m. In the present study, in the isolation distances studied until 100m, the level of contamination was well above the permissible minimum seed certification standards (98 % genetic purity for certified seed). However, based on the present study, the isolation distance required for maintenance of genetic purity of tomato using exerted stigma seed parent for hybrid seed production under open field conditions of Punjab is 150m as against the recommended isolation of 25m and 100m for production of certified seeds of open pollinated seeds and hybrid seeds, respectively.

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#### **5. VEGETABLE TYPE PIGEONPEA GERMPLASM IDENTIFIED AND EXPLORED FROM VAISHALI DISTRICT OF BIHAR**

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**ABSTRACT:** Genetic resources are the basic material for any crop improvement programme, obviously because they contain some unique traits/gene. Exploration for collection of germplasm is the quickest and simplest method for acquiring the desired one. Indian is world's biggest home of vegetarian inhabitants and legumes are main source of protein in their diet, pods are consumed fresh, or processed as vegetable either dried seed are used as *dal* or variety of preparation. A vegetable type pigeon pea of perennial nature has been identified and explored from Vaishali district of Bihar. Such promising and unique germplasm could be utilized by pigeon pea workers in their respective crop improvement programme to reinforcement food and nutritional security of country by efficient utilization.

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#### **6. QUALITATIVE EFFECT OF WRAPPING AND CUSHIONING MATERIALS ON GUAVA FRUITS DURING STORAGE**

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**ABSTRACT :** The aim of the present study was to investigate the effect of wrapping and cushioning materials on guava (*Psidium guajava* L.) fruits during storage. Fruits were packed in different wrapping and cushioning materials viz. Tissue paper, Cling wrap, Banana leaves and Teak leaves as wrapping materials, Neem leaves, Rice straw and Bamboo leaves as cushioning materials and control. All the treatments were kept at controlled room temperature ( $25\pm 2^\circ\text{C}$ ),

relative humidity (85±5%) in corrugated fibre board (CFB) boxes. The effectiveness of the treatments was assessed in terms of its impact on fruit appearance, weight loss, total soluble solids (TSS), titratable acidity, ascorbic acid contents and total sugars. It was found that wrapping of fruits with cling wrap showed better result for most of the parameters rating followed by wrapping with teak leaves. In organoleptic ratings fruits wrapped in teak leaves showed better result while poor rating was recorded in cling wraps.

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## **7. EFFECT OF VARIOUS MULCH MATERIALS AND SPACING ON GROWTH, YIELD AND QUALITY OF STRAWBERRY**

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**ABSTRACT:** An experiment was conducted at the Horticultural Research Farm of Babasaheb Bhimrao Ambedkar University, Lucknow. The experiment was performed to find out the most suitable mulching material and an ideal spacing for strawberry cultivation under Lucknow conditions. The experiment was laid out in a Factorial Randomized Block Design with three replications. The treatments comprised of six mulching materials viz. paddy straw, dry grass (*Saccharum* spp.), dry leaves (dry neem leaves), red polyethylene, green polyethylene and transparent polyethylene with two spacings (30 x 15 cm and 30 x 30 cm). On the basis of the statistical data, it is concluded that spacing of 30 x 30 cm with green polyethylene mulch was found to be the best in terms of plant growth viz. plant height, spread of plants, number of leaves and leaf area. Similarly, spacing of 30 x 15 cm with green polyethylene mulch significantly influenced number of flowers, fruit length and fruit width, yield and quality. However, there was slight difference in quality parameters among different treatments

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## **8. STUDIES ON SEED VIGOUR DETERIORATION IN PEA (*Pisum sativum* L.)**

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**ABSTRACT:** Seed vigour evaluation was conducted on ten pea accessions to study their level of deterioration at varying temperature and time durations. The accessions were subjected to different temperature (30°C and 45°C) and storage durations (48 hours and 72 hours) during accelerated ageing. Observations were recorded for seed vigour in terms of germination percentage, germination index, vigour index I, vigour index II and electrolyte leakage. Germination percentage and vigor index was greatly affected after subjecting to large durations of time at high temperature. The higher temperature (45°C) after 72 hours induced more electrolyte leakage from the some accessions. The results revealed that vigour level of seed deteriorates after storage at high temperature. Significant varietal differences were observed in accessions in terms of their inherent capacities to withstand higher temperature treatments both after 48 hours and 72 hours. The rate of seed deterioration was faster in some accessions as compared to other.

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## **9. EFFECT OF FOLIAR SPRAY OF ZINC, CALCIUM AND BORON ON SPIKE PRODUCTION OF GLADIOLUS CV. EUROVISION**

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**ABSTRACT:** The experiment was carried out on spike production in gladiolus with foliar application of zinc, calcium and boron, conducted in Horticulture Garden of Chandra Shekhar Azad University of Agriculture and Technology Kanpur in Randomized Block Design with four replications. The experimental plots were 32 with 8 treatments and two levels of each of zinc, calcium and boron treated by zinc sulphate 0.5%, calcium sulphate 0.75% and borax 0.2%, respectively. The results obtained revealed that the foliar spray of zinc at 0.5% to gladiolus plant was most effective to influence the vegetative growth and size of spike

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#### **10. PATH COEFFICIENT ANALYSIS FOR SEEDLING VIGOUR IN RADISH (*Raphanus sativus* L.) GENOTYPES**

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**ABSTRACT:** The field study was conducted during 2010 and 2011 to assess the genetic variability, inter relationships and direct and indirect effects of component traits on seedling vigour in radish. High PCV values were obtained in FW (32.68%), SVI I (32.43%) and germination % (30.84%). Magnitude of heritability was highest for SVI II (92.00%) followed by germination (89.45%), 100 SW (84.90%), ASL (83.16%) and SVI I (79.27%). SVI II showed positive and highly significant association with germination %,ASL, seedling FW, DW, 100 SW and SVI I. Path analysis indicated positive direct effect of SVI I, shoot length and 100 seed weight on seedling vigour index II of different radish genotypes. The seedling vigour index I, shoot length, 100 seed weight and germination % exhibited strong positive correlation and positive or negative direct effects on seedling vigour index II emerged as important components contributing to seedling vigour. Therefore, selection primarily based on these traits may lead to identification and development of genotypes having better field emergence and seedling establishment.

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#### **11. EFFECT OF POST HARVEST CALCIUM TREATMENTS ON SHELF LIFE OF GUAVA CV. SARDAR**

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**ABSTRACT:** The search for techniques that extend shelf life of guava (*Psidium guajava*) fruits, and reduce its postharvest losses is desirable. The objective of this work was to evaluate the effects of concentrations of competitive ethylene antagonist calcium salts on conservation of 'Sardar' guava fruits. Treatments consisted of 0.5%, 1% Calcium Nitrate, 1%, 2% Calcium Chloride and 0.5%, 1% Calcium Sulphate for 12 days followed by storage at room temperature. The application of 1% calcium chloride for 12 days was efficient in delaying loss of skin color and in keeping fruit firm at room temperature storage. The calcium nitrate at 1% concentration was efficient in delaying skin colour loss only when fruits were stored at 25°C. The effect of calcium nitrate was quite significant on the reduction of acceptability in both the year. The product was efficient in delaying the ripening of fruits and the calcium chloride 1% showed the best effect.

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#### **12. EFFECT OF NITROGEN AND PHOSPHORUS WITH NITROGEN SOURCES ON VEGETATIVE ATTRIBUTES OF TUBEROSE**

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**ABSTRACT:** An experiment was laid out during two consecutive years in Horticulture garden of C. S. Azad University of Agri. and Tech., Kanpur. There were three nitrogen sources viz. Urea, Ammonium Sulphate, Calcium Ammonium Nitrate; four levels of each of nitrogen (0, 50, 100 and 150kg/ha) and phosphorus (0, 100, 200 and 300 kg/ha), with a total of forty treatments. The results showed that there were no significant differences observed due to nitrogen sources in respect of sprouting of bulbs. Increasing doses of phosphorus caused relatively early sprouting during both the years of study. Phosphorus applied @ 200kg/ha expressed tallest plant during both the years of study. Number of leaves per plant improved under ammonium sulphate followed by calcium ammonium nitrate. Phosphorus @ 200kg/ha produced maximum number of leaves during both years. Application of 150kg N/ha or 200 kg phosphorus expressed highest leaf area followed by 100 kg N/ha.

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### 13. CORRELATION COEFFICIENT STUDIES IN ASHWAGANDHA (*Withania somnifera* Dunal) cv. JAWAHAR-20

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**ABSTRACT:** In an experiment conducted on ashwagandha (*Withania somnifera* Dunal), to study the response of different organic amendments with organic manure (FYM) and bio-fertilizers in relation to plant growth, root yield and quality parameters. It was found that the seedlings (5-7 leaf stage) inoculated with *Azospirillum* @ 10<sup>5</sup> or 10<sup>6</sup> CFU resulted a significant increase in plant growth and biomass yield which exhibited a positive association among them in contributing the root yield and quality traits. The maximum and positive correlation (0.884) was observed between the total alkaloid and withanoloid content followed by fresh root weight per plant (g) and fresh root yield per ha (0.831) and between plant height and number of leaves per plant (0.777). The association of the plant height also exhibited a highly significant correlation with stem diameter (0.659), alkaloid (0.777) and withanoloid (0.668) content in the roots. The number of leaves per plant had highly significant and positive correlation (1.99) with plant canopy followed by alkaloid (0.755) and withanoloid (0.774) contents. The fresh root weight per plant exerted the positive and significant effect of high magnitude (0.831) and fresh root yield (kg) per plot. Dry root weight per plant could established a significant and positive association (0.514) with dry root yield (kg) per ha. The total alkaloid content in the roots witnessed a highly significant and positive correlation with plant height (0.777), number of leaves per plant (0.755) followed by positive and significant association with stem diameter (0.573), number of berries per plant (0.554) and fresh root yield (kg) per plot (0.485). Withanoloid content (%) witnessed a highly significant and positive correlation with plant height (0.668), number of leaves per plant (0.754) and alkaloid content (0.884). Whereas a significant and positive correlation exhibited with stem diameter (0.581).

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### 14. INTEGRATED RESPONSE OF INORGANIC AND BIO-FERTILIZERS ON YIELD AND YIELD ATTRIBUTES OF TURMERIC

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**ABSTRACT:** A field experiment was conducted to study the effect of integration of bio- and inorganic fertilizers on yield and yield attributes of turmeric during 2007-08 and 2008-09 at Udai Pratap Autonomous College, Varanasi, U.P. The experiment was laid out with thirteen treatments consisted of combination of two variety of turmeric (V<sub>1</sub> – Padrauna local and V<sub>2</sub> – NDH-18) replicated three times in a randomized block design. The results indicated that application of T<sub>6</sub> (NPK 180:90:90 kg per ha + *Azotobacter chroococcum* @ 2.5 kg per ha + *Pseudomonas fluorescens* @ 2.5 kg per ha) significantly increased yield and all yield attributes over all treatments, whereas treatment T<sub>9</sub> (50% R.D. of inorganic nitrogen + 50% R.D. of inorganic phosphorus + 100% R.D. of potash + *Azotobacter chroococcum* @ 2.5 kg per ha + *Pseudomonas fluorescens* @ 2.5 kg per ha + 50% nitrogen through carpet waste) was closely followed by treatment T<sub>6</sub>. In respect of turmeric variety, NDH-18 was found superior over variety Padrauna local in all above conditions. On the basis of performance treatment T<sub>6</sub> and T<sub>9</sub> may be adopted for higher yield and sustainability.

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### 15. EFFECT OF ENVIRONMENTAL FACTORS ON *Phytophthora* BLIGHT DEVELOPMENT OF COLOCASIA

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**ABSTRACT:** Progress of *Phytophthora* blight of taro (*Colocasia esculenta* var. *antiquorum*) caused by *Phytophthora colocasiae* Racib. was found greatly influenced by environmental factors prevalent under field condition. Per cent plant infection, disease intensity, coefficient of disease index and related progress of disease were periodically recorded on a susceptible

variety Narendra Arvi-2. The maximum and minimum infection rate ('r') was observed in 33<sup>rd</sup> and 32<sup>nd</sup> standard week during 2006 and 2007. Disease intensity and per cent plant infection were significantly but positively correlated with rainfall and relative humidity in both the year. Disease intensity and per cent plant infection were negatively but none significantly correlated with maximum temperature in 2007 but positively correlated in the year 2006. However, rest of the weather factors were positively correlated to disease intensity and per cent plant infection in both the years. Relative humidity, cumulative rainfall and sunshine hour were found most congenial environmental factors for leaf blight development of taro.

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#### **16. EFFECT OF CHEMICAL AND BIO-FERTILIZERS ON QUALITY OF ONION**

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**ABSTRACT:** The present investigation comprising the supplementation of chemical and bio-fertilizers for onion crop was carried out under field conditions at Babasaheb Bhimrao Ambedkar University, Lucknow during *rabi* season of 2010-2011. The experiment comprised of four levels of chemical fertilizers and six levels of biofertilizers. The maximum ascorbic acid, reducing sugar and total sugars were found with the application of T<sub>11</sub> (100 kg N + 50 kg P + 70 kg K/ha + 2 kg/ha *Azotobacter* + 2 kg/ha *Phosphobacteria*). The maximum TSS, non-reducing sugar, phosphorus and calcium were found under the treatment T<sub>12</sub> (100 kg N + 50 kg P + 70 kg K/ha + 2 kg/ha *Azotobacter* + 1.9 kg/ha VAM). The minimum values were found under the control i.e. T<sub>1</sub>. Results obtained by the application of inorganic fertilizers with biofertilizers exhibited significant effect on various parameters studied under the investigation.

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#### **17. MANAGEMENT OF PHOMOPSIS LEAF BLIGHT OF BRINJAL THROUGH DIFFERENT FUNGICIDES AND BIOPESTICIDE**

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**ABSTRACT:** Phomopsis leaf blight caused by *Phomopsis vexans* is an important disease of Brinjal (*Solanum melongena* L.) in Eastern U.P. Therefore, efficacy of fungicides and biopesticides were tested *in-vitro* and *in-vivo*. Bavistin (0.1%), Vitavax (0.1%), Blitox-50 (0.2%), and Ridomil (0.15%) proved to be the most effective in inhibiting the growth of pathogen *in-vitro* and controlling the disease in the field. Biopesticide, Nimbidine was also proved effective, but slightly less effective than systemic fungicide except Indofil M-45, Nimbidine being a safe eco-friendly and economical bioproduct which can be used in the management of the disease.

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#### **18. CHIRONJEE : A PROMISING TREE FRUITS OF DRY SUBTROPICS**

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#### **19. EFFECT OF AgNO<sub>3</sub> AND 8-HQC ON VASE LIFE OF CUT ROSES**

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#### **20. MORPHOLOGICAL MARKERS FOR IDENTIFICATION OF *Populus deltoides* CLONES IN NURSERY**

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